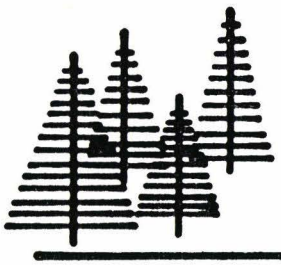
SB761
U7I5
89-1

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE



FOREST PEST MANAGEMENT

3420
Report No. R-4 89-1
February 1989

STATE & PRIVATE FORESTRY

INTERMOUNTAIN REGION

Douglas-fir Tussock Moth Monitoring in Southern Idaho, 1988

By

Julie C. Weatherby[1]
and
Richard L. Halsey[2]

ABSTRACT

Based on the results of a 1988 Douglas-fir tussock moth survey, populations of the insect appear to be declining in southern Idaho. Defoliation is not anticipated at the 20 trapping sites in 1989.

---

[1]Entomologist, USDA Forest Service, Intermountain Region, Forest Pest Management, Boise, ID
[2]Biological Technician, USDA Forest Service, Intermountain Region, Forest Pest Management, Boise, ID

LIBRARY COPY
ROCKY MT. FOREST & RANGE
EXPERIMENT STATION

INTRODUCTION

Population outbreaks of the Douglas-fir tussock moth, Orgyia pseudotsugata (McD.), occur cyclicly throughout the interior forests of the west (Brookes et al., 1979). During an outbreak, populations increase rapidly, peak, and decline within a 3 to 4 year period. Defoliation of Douglas-fir, grand fir, and to a lesser extent subalpine fir can be severe. Larvae preferentially feed on new foliage but will consume older foliage when populations are very large. Severe defoliation can cause growth reduction, top-kill, and tree mortality.

An early detection survey, utilizing sampling methods designed to detect population increases 1 to 2 years prior to an outbreak, has been used operationally in southern Idaho since 1981. This report documents the results of the 1988 early detection survey.

METHODS

The early detection survey in use throughout southern Idaho includes deployment of pheromone-baited traps to detect male moths and beating of lower crown foliage (to detect and quantify low or suboutbreak larval populations), at sites where trap catches the preceeding year exceeded 40 moths per trap (Sowers, per. comm.). Fairly complete data sets from 1982 to 1987 exist for 20 previously sampled sites (Weatherby, 1988); therefore these sites were selected as sampling sites for 1988. At each sampling site, five pheromone-baited traps were deployed following the procedures outlined by Daterman et al. (1979). Additionally, based upon the results of the 1987 catch, pheromone-baited trapping was intensified at 2 sites--the Little Water Gulch site on the Sawtooth National Forest and the Dewey Peak site on the Bureau of Land Management lands in the Owyhee Mountains--where the 1987 catch exceeded 25 moths per trap. The rationale supporting the selection of this 25-moth threshold has been explained by Thier (1987). At these sites, two additional sets of five traps each were deployed in stands located within 1 mile of the original site. Data collected at each site included the number of male moths captured within each trap.

An additional monitoring method being developed cooperatively by FPM Region 5 and the University of California to sample the population seeking pupation sites was evaluated for the second year at each of the 20 original sampling sites. This method involves selecting 10 host trees within the trapping site and nailing 2 cryptic shelters to opposite sides of the bole of each tree. Data collected included the total number of pupae per shelter, the sex distribution of these pupae, and the condition of each pupa--either healthy, parasitized, or dead from unknown causes.

Table 1 lists the locations of the original 20 sampling sites, the sampling method used at each site, and the sampling dates.

RESULTS AND DISCUSSION

The annual mean trap catches for all sites monitored since 1980 are listed in Table 2. The average number of male moths per trap recovered in 1988 indicated that populations generally declined throughout southern Idaho. Trap catches

Table 1.--Location and sampling methods utilized during the 1988 Douglas-fir tussock moth early warning survey in southern Idaho.

Plot	Location			Larval Samples	Cryptic Shelters*		Pheromone traps	
	Twp.	Rge.	Sec.	Date	Checked	#	Instal.	Retrv.
Boise NF								
Bear Creek	4N	10E	7	N.S.	10/13	5	7/11	10/13
Skunk Creek	12N	4E	14	N.S.	10/13	5	7/07	10/13
Payette NF								
Adams Creek	14N	6W	23	N.S.	10/12	5	7/06	10/12
Barinaga Corral	20N	2W	23	N.S.	10/13	5	7/07	10/13
Bear Saddle	15N	5W	31	N.S.	10/12	5	7/06	10/12
E. Fk. Brownlee Creek	16N	4W	3	N.S.	10/12	5	7/06	10/12
Fourbit Creek	13N	2E	7	N.S.	10/12	5	7/07	10/12
McDowell Trail	17N	2W	17	N.S.	10/13	5	7/07	10/13
Olive Creek	17N	2W	7	N.S	10/13	5	7/07	10/13
Seid Creek	16N	4W	21	N.S.	10/12	5	7/06	10/12
Stacy Creek	14N	6W	14	N.S.	10/12	5	7/06	10/12
Salmon NF								
Colson Creek	23N	16E	12	N.S.	10/04	5	7/26	10/04
Lick Creek	26N	22E	32	N.S.	10/04	5	7/26	10/04
Sawtooth NF								
Little Water Gulch	3N	12E	7	N.S.	10/13	15	7/11	10/13
Virginia Gulch	3N	11E	9	N.S.	10/13	5	7/11	10/13
Idaho State Lands								
Sharps Canyon	2N	19E	36	N.S.	10/27	5	8/19	10/27
BLM Lands								
Dewey Peak	6S	4W	3	N.S.	10/11	15	7/05	10/11
Mill Creek	8S	5W	12	N.S.	10/11	5	7/05	10/11
New York Summit	4S	3W	32	N.S.	10/11	5	7/05	10/11
So. Fk. Boulder Creek	8S	5W	24	N.S.	10/11	5	7/05	10/11

* = Cryptic shelters are permanent and are repaired or replaced when pheromone traps are installed

N.S. = Not sampled

Table 2.--Summary of male Douglas-fir tussock moths caught in pheromone-baited sticky traps distributed in southern Idaho - 1980 - 1988.

Plot	Location			Mean Number of Male Douglas-fir Tussock Moths/Trap by Year								
	Twp.	Rge.	Sec.	1980	1981	1982	1983	1984	1985	1986	1987	1988
Boise NF												
Anderson Creek Divide	14N	2E	14	N.S.[1]	1.2	0.0	11.0	N.S.	N.S.	N.S.	N.S.	N.S.
Bear Creek	4N	10E	7	N.S.	N.S.	0.0	32.8	0.4	0.0	1.2	1.4	0.6
Skunk Creek	12N	4E	14	N.S.	0.2	0.6	29.0	0.0	1.0	1.2	0.2	0.2
Yellow Pine Creek	3N	10E	35	N.S.	N.S.	0.0	10.6	0.4	N.S.	N.S.	N.S.	N.S.
Payette NF												
Adams Creek	14N	6W	23	N.S.	N.S.	53.6	39.6	7.8	4.0	17.6	8.8	1.8
Barinaga Corral	20N	2W	23	N.S.	N.S.	N.S.	44.2	0.4	2.8	4.0	2.0	0.0
Bear Saddle	15N	5W	31	N.S.	N.S.	15.2	44.0	1.0	0.2	0.2	0.4	0.0
Brown's Pond	18N	4E	3	N.S.	0.0	0.6	11.0	0.5	N.S.	N.S.	N.S.	N.S.
E. Fk. Brownlee Creek	16N	4W	3	N.S.	N.S.	61.2	50.6	2.6	3.4	27.0	6.0	0.2
Fourbit Creek	13N	2E	7	N.S.	N.S.	49.8	42.8	N.S.	4.8	30.4	2.0	2.2
Little Weiser	13N	1E	1	N.S.	N.S.	N.S.	25.6	N.S.	0.6	0.4	N.S.	N.S.
McDowell Trail	17N	2W	17	N.S.	N.S.	N.S.	35.8	5.0	6.8	24.6	1.2	0.0
Olive Creek	17N	2W	7	N.S.	N.S.	36.8	51.2	14.6	10.5	46.8	9.8	3.2
Seid Creek	16N	4W	21	N.S.	N.S.	N.S.	17.4	11.2	N.S.	27.2	4.8	1.6
Stacy Creek	14N	6W	14	N.S.	N.S.	N.S.	42.8	18.0	8.8	3.8	5.0	0.0
Salmon NF												
Arnett Creek	22N	20E	30	N.S.	N.S.	0.0	0.6	0.0	N.S.	N.S.	N.S.	N.S.
Colson Creek	23N	16E	12	N.S.	N.S.	15.2	39.0	3.2	N.S.	7.2	5.2	14.0
Headwaters	20N	20E	9	N.S.	N.S.	N.S.	N.S.	0.0	N.S.	N.S.	N.S.	N.S.
Lick Creek	26N	22E	32	N.S.	N.S.	7.6	38.4	0.6	N.S	6.0	0.6	28.5
Porphyry Creek	20N	18E	34	N.S.	N.S.	0.0	4.6	0.0	N.S.	N.S.	N.S.	N.S.
Sawtooth NF												
Couch Summit	2N	14E	9	N.S.	0.4	0.0	7.0	0.0	N.S.	N.S.	N.S.	N.S.
Howell Canyon	12S	25E	31	N.S.	N.S.	N.S.	N.S.	0.2	N.S.	N.S.	N.S.	N.S.
Little Water Gulch	3N	12E	7	N.S.	3.8	13.6	27.0	17.2	0.0	34.6	26.6	4.0
Virginia Gulch	3N	11E	9	N.S.	0.6	2.0	26.8	1.8	0.0	4.8	6.8	2.6
Warm Springs	4N	17E	14	N.S.	N.S.	2.6	14.8	0.8	N.S.	N.S.	N.S.	N.S.
Idaho State Lands												
Sharps Canyon	2N	19E	36	N.S.	19.4	16.2	41.2	1.3	5.2	22.6	8.4	36.4
BLM Lands												
Dewey Peak	6S	4W	3	55.0	64.0	N.S.	N.S.	15.0	1.6	33.7	38.6	47.0
Mill Creek	8S	5W	12	0.6	47.6	N.S.	N.S.	6.6	0.0	0.4	0.0	0.2
New York Summit	4S	3W	32	N.S.	N.S.	N.S.	N.S.	0.0	N.S.	1.8	3.8	15.0
So. Fk. Boulder Creek	8S	5W	24	N.S.	N.S.	N.S.	N.S.	0.7	0.2	1.8	0.2	0.8

[1] N.S. - not sampled

decreased at 12 of the original 20 sites, remained relatively static at 5 sites and increase by more than 10 moths per trap at 3 sites. Trap catches exceeded the 25 moth threshold at 3 of the original sites, the Dewey Peak site on Bureau of Land Management lands in the Owyhee Mountains, for the third consecutive year, the Lick Creek site on the Salmon National Forest, and the Sharps Canyon site on Idaho State Lands.

Based upon the 1988 catch, intensified trapping should be continued at the Dewey Peak and implemented at the Lick Creek and Sharps Canyon sites in 1989. Additionally, in 1989, larval sampling should be conducted at the Sharps Canyon and the Dewey Peak sites as 1988 trap catches are either very close to or surpass the 40-moth threshold.

Table 3 summarizes trap catch information at sites where the two additional sets of traps were deployed in 1988. Trap catches in the additional sets at each site were well below the 25-moth threshold. It is interesting to note that at the original Dewey Peak site catches averaged more than 40 moths per trap for the third consecutive year, while those at the additional trap locations were well below that.

Table 3.--Mean number of male Douglas-fir tussock moths recovered in pheromone traps at the intensified trapping sites in southern Idaho, 1988.

Plot	Mean No. Moths/Trap		
	Original Site	Extra Set	Extra Set
Sawtooth N.F.			
Little Water Gulch	4.0	1.0	5.2
B.L.M. Lands			
Dewey Peak	47.0	12.4	2.4

Defoliation caused by the Douglas-fir tussock moth is not anticipated in 1989 even at sampling sites where trap catches were relatively high. Trap catches exceeding 50 moths may portend defoliation the following year. Based on historical records from 1981 to 1987, defoliation has not been detected in survey areas where catches averaged fewer than 50 moths per trap (Weatherby, 1988). During the 1982-83 outbreak in the Owyhee Mountains, defoliation was detected following trap catches averaging 50 to 55 moths (Thier, 1987). If the 1989 trap catch at the Dewey Peak site continues to increase at the present rate, trap catches might reach this level in 1989.

The 1988 results of pupal sampling via cryptic shelters are summarized in Table 4. Unlike the 1987 results, which suggested a possible positive correlation between total pupal cases and mean moth catch per site (Weatherby, 1988), the 1988 data does not support this relationship. Pupal cases were found at only three sites which had moth catches ranging from 1.75 to 47.0 moths per trap. Of these, 4 viable pupae were found at Little Water Gulch where an average of 4.0 moths per trap was captured. At Dewey Peak, where the trap catch averaged 47.0 moths per trap, 2 viable and 4 failed pupae were found.

Table 4.--Numbers of pupal cases by sex recovered in the 20 cryptic shelters located at each sampling site in southern Idaho, 1988.

Plots	Mean # Moths/Trap	Total No. Pupal Cases		
		Females	Males	Failed
Boise NF				
Bear Creek	0.6	0	0	0
Skunk Creek	0.2	0	0	0
Payette NF				
Adams Creek	1.8	0	0	3
Barinaga Corral	0.0	0	0	0
Bear Saddle	0.0	0	0	0
E. Fk. Brownlee	0.2	0	0	0
Fourbit Creek	2.2	0	0	0
McDowell Trail	0.0	0	0	0
Olive Creek	3.2	0	0	0
Seid Creek	1.6	0	0	0
Stacy Creek	0.0	0	0	0
Salmon NF				
Colson Creek	14.0	0	0	0
Lick Creek	28.5	0	0	0
Sawtooth NF				
Little Water Gulch	4.0	1	3	0
Virginia Gulch	2.6	0	0	0
Idaho State Lands				
Sharps Canyon	36.4	0	0	0
BLM Lands				
Dewey Peak	47.0	1	1	4
Mill Creek	0.2	0	0	0
New York Summit	15.0	0	0	0
So. Fk. Boulder Creek	0.8	0	0	0

LITERATURE CITED

Brookes, M.H.; Stark, R.W.; Campbell, R.W. eds. The Douglas-fir tussock moth: a synthesis. USDA Technical Bulletin 1585; 1979. 331 p.

Daterman, G.E.; Livingston, R.L.; Wenz, J.M.; Sower, L.L. How to use pheromone traps to determine outbreak potential. USDA Agriculture Handbook 546; 1979. 11 p.

Thier, R.W. Douglas-fir tussock moth monitoring in southern Idaho 1986. R-4 87-4. Ogden, UT: USDA Forest Service Intermountain Region; 1987. 4 p.

Tunnock, S.; Ollieu, M.; Thier, R.W. History of Douglas-fir tussock moth and related suppression efforts in the Intermountain and Northern Rocky Mountain Regions 1927 through 1984. R-1 85-13. Missoula, MT: USDA Forest Service Intermountain and Northern Regions; 1985. 51 p.

Weatherby, J.C. Douglas-fir Tussock Moth Monitoring in southern Idaho, 1987. R-4 88-1. Ogden, UT: USDA Forest Service Intermountain Region; 1988. 7 p.